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10/567,096	02/21/2006	Satoshi Yamamoto	126840	4629

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EXAMINER	
ORLANDO, MICHAEL N	

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1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.**	**Applicant(s)**
	10/567,096	YAMAMOTO ET AL.
	Examiner	**Art Unit**
	MICHAEL N. ORLANDO	1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _14 August 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-28_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-28_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The examiner recognizes the arguments and amendments submitted August 14^{th}, 2008 and have taken them into consideration; however, the claims continue to be unpatentable over the prior art as set forth below

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

   1. Determining the scope and contents of the prior art.
   2. Ascertaining the differences between the prior art and the claims at issue.
   3. Resolving the level of ordinary skill in the pertinent art.
   4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-23, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joachimi et al. (US 2003/0125429 A1) in view of Aylward et al. (US 5,998,119) further in view of Andrew (US 3,459,575).

Regarding claim 1, Joachimi et al. teaches a thermoplastic molding composition (thermoplastic resin) and moulded parts produced therefrom, which is laser-transmitting (i.e. transparent) to lasers in the range of 700-1200nm ([0001]) and is used for laser welding ([0001]). The composition is taught to contain inorganic pigments such as titanium dioxide ([0067]) whereby said pigments are added as a colorant and if they absorb in the region of the laser utilized in the laser welding process then they may be used in small quantities so as to allow for at least partial transmission of the laser light ([0067]). Joachimi et al. further teaches that the titanium dioxide utilized can be rutile, which is a natural form of titanium dioxide known to possess a density in the range of 5.5 - 6.5 g/cm^3 (at least 4 g/cm^3). It is recognized by the examiner that titanium dioxide (rutile) was a well-known pigment at the time of the invention and it was understood that the color of said rutile was a brilliant white. It is also recognized by the examiner that although the composition is not explicitly stated as white, gray or tint color, given the short list of dyes presented by Joachimi et al. it would have been easily understood by one of ordinary skill in the art that said color scheme was easily attainable by utilizing

the colorants set forth by the invention. It is further taught by Joachimi et al. that the utilization of pigments in the moulding composition is kept at a low level and given the examples of moulding composition mixes disclosed, the pigments are taught to at most account for 0.52 wt% (table 1, examples 1-4). It is recognized by the examiner that 0.52 wt% of the pigment would equate to approximately 0.5 parts by weight of the pigment per 100 parts by weight of the moulding composition. It is also noted that in addition to the following arguments for the reasons of choosing white, the claims are also directed to gray and tint which would seem to be encompassed by Joachimi absent a specific definition of the terms gray and tint because gray and tint can clearly be viewed as dark especially in relation to colors such as white.

Joachimi et al. fails to explicitly teach the particle size of the titanium oxide in the range of 100-400nm and also fails to each that the overall composition has a ratio of 100 parts by weight of a thermoplastic resin to 0.01-3 parts by weight of the titanium oxide. Joachimi further fails to explicitly teach surface treating the titanium oxide particles.

Aylward et al. teaches the use of titanium dioxide in photo imaging paper with the pigment diameter in the range of 0.1-0.26μm (i.e. 100-260nm) and preferably utilizing the rutile variant of said titanium dioxide (column 6, lines 25-37).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the titanium oxide in the amount of 0.01-3 parts by weight per 100 parts by weight of the thermoplastic resin in light of the teachings of Joachimi et al. because it was known that if pigments are added as a colorant and they absorb in the

region of the laser utilized in the laser welding process then they should be used in small quantities so as to allow for at least partial transmission of the laser light ([0067]) and furthermore the explicit examples taught by Joachimi et al. indicate that other such pigments are utilized in the range of approximately 0.5 parts by weight of the pigment per 100 parts by weight of the thermoplastic resin (table 1, examples 1-4). It would have also been obvious to one of ordinary skill in the art at the time of the invention to modify the invention taught by Joachimi et al. and use titanium dioxide with an average particle size (i.e. diameter) in the range of 100-260nm in view of Aylward et al. because it was known that using particle sizes in said range allows for sufficient opaqueness rather than an undesired lack of opaqueness (less than 100nm) or increase in yellowing (over 260nm) (column 6, lines 30-37). It is recognized by the examiner that in order to obtain a whitish/opaque laser-transmitting composition it would have been recognized by one of ordinary skill in the art that the particle sizes taught by Aylward et al. should be preferentially utilized. Joachimi even provides the specific white dye that is presently claimed, titanium oxide ([0067], [0076], and [0079]); however, Joachimi merely fails to teach the explicit particle sizes. Joachimi even goes on to state that the primary problem with whitish work pieces is they tend to yellow and therefore become aesthetically unpleasing ([0015]). Aylward, while drawn to a different field of endeavor, presents subject matter that is pertinent to the present problem of Joachimi because Aylward discloses that when titanium oxide is utilized as a white pigment it should be used with specific particle sizes (namely 100-260nm; column 6, lines 25-40) so as to prevent yellowing.

Andrew discloses surface treating titanium oxide particles with aluminum oxide (i.e. alumina; column 2, lines 30-35).

It would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the composition of Joachimi to further include surface treating the titanium oxide particles in view of Andrew for the purpose of imparting desired, essential color, durability and non-yellowing characteristics to the pigment (column 2, lines 30-35).

Regarding claim 2, the composition of claim 1 is taught as seen above. There is no specific reference by Joachimi et al. in regards to the refractive index of either of the thermoplastic resin or the titanium dioxide; however, it was well known in the art at the time the invention was made that rutile (a common form of titanium dioxide) has an extremely high refractive index (2.60+) that would exceed the refractive index of the thermoplastic resin therefore leading to an $n1-n2$ that is inherently greater than 1.0. It is taught by Joachimi et al. that the laser-transparent plastics can include polyamides, polypropylene and polycarbonate ([0027]-[0028]), which were all well-known in the art to have refractive indexes in the range of 1.5-1.6. Given the teachings of the above mentioned laser-transparent plastics and the rutile (titanium dioxide) colorant, it is clear the invention taught by Joachimi et al. would have resulted in $n1-n2$ as greater than 1.0 and $1.4 < n2 < 1.7$.

Regarding claim 3, the composition of claim 1 is taught as seen above. Joachimi et al. further teaches that the laser-transmissible resin (laser-transparent plastic) can be composed of polycarbonate or polypropylene ([0027]-[0028]).

Regarding claim 4, the composition of claim 1 is taught as seen above. It is further taught by Joachimi et al. that the utilization of pigments in the moulding composition is kept at a low level and given the examples of moulding composition mixes disclosed the pigments are taught to at most account for 0.52 wt% (table 1, examples 1-4). It is recognized by the examiner that 0.52 wt% of the pigment would equate to approximately 0.5 parts by weight of the pigment per 100 parts by weight of the moulding composition. The pigments disclosed in the examples (perinone, anthraquinone, pyrazolone) are all organic dyes that are inherently laser-transmissible for laser lights in the range of 800nm-1200nm.

Regarding claims 5 and 6, the composition of claim 1 is taught as seen above. Joachimi et al. further teaches that the composition may also contain fire retardants (i.e. flame retarders), mica, calcium carbonate or glass fibers ([0037]-[0038]).

Regarding claims 7-12, the claims are substantially similar to claims 1-6 and differ in that claims 1-6 are drawn to a composition and claims 7-12 are drawn to a workpiece molded out of said composition. It is taught by Joachimi et al. that the thermoplastic moulding composition discussed above can be produced into moulded parts (i.e. a workpieces) and can be bonded to other moulded parts by laser transmission welding ([0085]).

Regarding claim 13, the workpiece of claim 7 is taught as seen above. Joachimi et al. fails to explicitly teach the whiteness degree being at least 80.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve said whiteness degree given that the limitations of the

invention have been already been disclosed in the prior art (Joachimi et al.) and one of ordinary skill would have been able to utilize the invention disclosed by Joachimi et al. and in so desiring, would have understood how to mix the white colorants and in particular rutile as discussed above in a manner to attain to such a hue without parting from the scope of the invention.

Regarding claim 14, the workpiece of claim 7 is taught as seen above. It is specifically taught by Joachimi et al. that the moulding composition (used to mould the workpiece) has a transmission in the NIR (700-1200nm) of preferably greater than 30% ([0022]). Also, it would have been recognized by one of ordinary skill in the art at the time the invention was made that the teachings of Joachimi et al. are based upon the workpiece being laser-transmissible ([0020]).

Regarding claims 15-22, the claims are substantially similar to claims 7-14 and differ in that the claims have incorporated the workpiece being actively used in a laser welding process whereby the laser-transmissible workpiece is piled upon a laser-absorbing workpiece and then irradiated with a laser beam to weld the two thermally. It is taught by Joachimi et al. that the thermoplastic moulding composition discussed above can be produced into moulded parts (i.e. a workpieces) and can be bonded to other moulded parts by laser transmission welding ([0085]). Furthermore the method of laser welding is taught by Joachimi et al. to include the laser penetrating the first component, which is sufficiently transparent to the laser (transmissible) and then the laser light is absorbed by the second component (laser-absorbing) and heat is

generated which leads to melting at the contact zone and bonding of the two components ([0007]).

Regarding claims 23 and 26, the claims hinge around the laser absorbent workpiece being of substantially the same whiteness degree as the above mentioned laser-transmissible workpiece and also being absorbent to the laser light in the range that the laser-transmissible workpiece is transmissible to the laser light.

It was well-known to those of ordinary skill in the art at the time the invention was made that the second workpiece used as the absorption layer must absorb the laser light in the range that the transmissible layer allows it to pass, otherwise the laser welding process would be inefficient or impossible. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve said whiteness degree given that the limitations of the invention have been already been disclosed in the prior art (Joachimi et al.) and one of ordinary skill would have been able to utilize the invention disclosed by Joachimi et al. and in so desiring, would have understood how to mix the white colorants and in particular rutile as discussed above in a manner to attain to such a hue without parting from the scope of the invention. Also, as discussed above, a preferred characteristic of the invention taught by Joachimi et al. was to create two moulded parts that exhibit similar optical appearance in terms of color (i.e. same whiteness degree) ([0020]). The subsequent laser welding for the moulding composition taught by Joachimi et al. was meant to be carried out in the range of 700-1200nm as was consistent with the laser-transmissible moulding composition ([0022]). It is recognized by the examiner that Joachimi et al. does not

teach the wavelength range of 800-1200nm, but it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize said range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller,* 105 USPQ)

Regarding claim 25, the method of claim 23 is taught as seen above. Furthermore it was recognized by Joachimi et al. that carbon black could be used as the laser-absorbing component ([0014]).

5. Claims 24, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joachimi et al. (US 2003/0125429 A1), Aylward et al. (US 5,998,119) and Andrew (US 3,459,575), as applied to claim 23 above, further in view of Savitski et al. (US 6,596,122 B1).

Regarding claim 24, 27 and 28, the method of claim 23 is taught as seen above. As discussed above in claim 23 Joachimi et al. teaches the whitish resin, the need for both a laser-absorbent layer and laser-transmissible layer and the desire to create two optically similar (i.e. both layers are same color) layers. Joachimi et al. further teaches the need for the absorptive layer and transmissible layer to be functional for laser light wavelengths in the range of 700-1200nm as is also discussed in claim 23 above. Further disclosed by Joachimi et al. are the teachings that absorption and thus conversion of laser light into heat (i.e. laser welding) can be controlled by means of pigments, filler, and other additives indicating that it was known at the time of the invention that the addition of other additives can be used as a means to increase the

absorption of the absorptive layer if so is desired without parting from the scope of the invention.

Joachimi et al. fails, however, to explicitly teach the whitish resin material applied to the laser-absorptive layer as either a film, an ink or a paint despite the fact that it would have been recognized that the absorbent layer must be absorbent in the wavelength range of 700-1200nm to function as a proper laser-absorbing member in the invention taught by Joachimi et al..

Savitski et al. teaches a method for joining plastic materials whereby the bonding of the materials occurs by passing radiation through one or more transmitting materials and into a radiation absorbing material (i.e. laser welding), which in turn generates heat and effects the bond. (column 1, lines 14-20). The method further defines radiation as consistent of a wide variety of lasers some of which include YAG and carbon dioxide lasers (column 6, lines 35-39). It is further taught by Savitski that a wide variety of combinations of transmitting and absorbing materials can be made that includes emulsions of pigments (i.e. whitish resin) readily painted onto interface materials or using the absorbing material as a thin film as two such methods of generating the absorbing material (column 4, lines 1-19).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the resin taught by Joachimi et al. in such a manner as that disclosed above by Savitski et al. since it was known that absorbing materials can be constructed in numerous ways extending beyond merely moulding them into a workpiece and it

would have been understood that these uses were interchangeable and could be preferentially utilized dependent on the immediate needs of the user.

Response to Arguments

Applicant's arguments filed August 14, 2008 have been fully considered but they are not persuasive.

The applicant contends that Joachimi does not teach a whitish welding piece and that it would not have been obvious to look to the teachings of Aylward.

The examiner agrees that Joachimi is drawn primarily to darker work pieces, but it can be appreciated that there are many instances where darker pieces are not aesthetically useable and there would be a requirement for a lighter piece. The arrival at a lighter piece would have been within the purview of an ordinary skilled artisan (and therefore obvious) because such would have merely required the use of lighter/whitish dyes which have already been presented by Joachimi. As set forth above Joachimi even provides the specific white dye that is presently claimed, titanium oxide ([0067], [0076], and [0079]); however, Joachimi merely fails to teach the explicit particle sizes. Joachimi even goes on to state that the primary problem with whitish work pieces is they tend to yellow and therefore become aesthetically unpleasing ([0015]). Aylward, while drawn to a different field of endeavor, presents subject matter that is pertinent to the present problem of Joachimi because Aylward discloses that when titanium oxide is utilized as a white pigment it should be used with specific particle sizes (namely 100-260nm; column 6, lines 25-40) so as to prevent yellowing.

The applicant contends that the claimed surface treatments increase the degree of whiteness for laser welding.

The examiner notes that Andrew, which is relied upon for surface treatment, teaches that surface treatment via alumina imparts color (column 2, line 30). Also, the invention of Andrew submits that one of the purposes of the invention is to surface treat the titanium oxide so as to achieve superior color (column 1, lines 25-30). The increase in degree of whiteness is merely a rephrasing of the expected results set forth by Andrew whereby such was known to yield superior color (i.e. increased whiteness). Applicant's declaration has been considered. The declaration is not commensurate with the scope of the claimed subject matter since the claims are also directed to gray or tint colors and the declaration only shows white. Gray and tint are clearly within the scope of darker work pieces. Furthermore, the fact that a color enhancement is achieved by the coated titanium dioxide, is not an unexpected result, since Andrew clearly teaches that this is an expected result (column 2, lines 18-35). Finally it is submitted that even in the event that more proof is supplied the transmissivity change would merely be taken as an inherent property resultant from Andrews's surface treatment which would have already been an obvious incorporation in view of its ability to provide superior color.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL N. ORLANDO whose telephone number is

(571)270-5038. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm, alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip C. Tucker can be reached on (571) 272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MO

/Philip C Tucker/

Supervisory Patent Examiner, Art Unit 1791